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ABSTRACT

This paper presents the initial efforts in the development of the Prediction with Diagnostic Qualities (PDQ) instrument. The contents include: "Evidence Relating to Correlational Items," which discusses the concepts of correlation, statistical significance, and the more commonly used criteria or tests used for prediction and diagnosis--chronological age, mental age IQ, socioeconomic status, neurological deficits, emotional problems, reading readiness tests, teacher judgment, visual-motor integration, and knowledge of letter names; "What Is Necessary for Success in Reading," which looks at what children need for success in reading and how to diagnose for those needs; "PDQ Procedures," which discusses the PDQ battery and lists the tests included such as auditory discrimination, listening comprehension, vocabulary, categorization, picture sequence, oral language development, following oral directions, and using oral context; "Preliminary Results of PDQ," which presents the results and findings of the use of PDQ in a kindergarten program; "Implications for Instruction," which presents examples of the kinds of kindergarten activities appropriate for children who need additional work in a given area; and "Summary." (WR)

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"Early Identification PDQ: Prediction with Diagnostic Qualities"

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For several years this researcher has been concerned with the difference between what "Early Identification" ought to be and what it is. Early identification ought to be a procedure for diagnosing all children to determine what they already have and what they still need in order to be successful in reading; it ought to imply direct and more individualized instruction in kindergarten.

In contrast, the usual identification procedures are what typical titles imply, i.e., efforts at "predicting reading failure." At best, these programs -- whether conducted in kindergarten or pre-kindergarten -- are usually procedures for screening out

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children who need Special Education. Too often, however, the programs merely use correlational items to initiate the self-fulfilling prophecy. The usual procedure goes something like this:

1. Children are tested with items which correlate with reading success.
2. Those who score low are identified as "poor risk" and are assigned activities unrelated to reading skill development.
3. Subsequent evaluation of reading achievement reveals that these children did indeed fail, therefore the tests were "good."

How well this procedure works was demonstrated by Fry (1965) using eight first-grade classes, randomly assigned to "readiness" and to reading instruction. While one group was learning to read, the "readiness" group was engaged in activities unrelated to reading. The results of achievement testing were never in doubt.

Yet, these kinds of predeterminations continue. Typical is the case reported by Book (1974). Kindergarten children were screened using IQ scores, Metropolitan Readiness Tests and the Bender-Gestalt. Based on scores, the children were neatly pigeon-holed into one of six categories, ranging from mentally retarded to enrichment. Comparison of placement with reading achievement at the end of grade one resulted in the nearly perfect correlation of .99.

Rather than being pleased with such "successful" predictions, we ought to be angry that something wasn't done to thwart the

prediction. After all, to alert a kindergarten teacher to a "poor risk" might be helpful if she is buying stock and has the choice of avoiding risk; in the case of her children, she has no such choice and therefore must discover why the child is a "poor risk" and what she can do to help him.

Concerns such as these have led to PDQ, an early identification procedure for pre-kindergarten children. Items selected for testing have diagnostic value, i.e., they have direct implications for follow-up instruction to remove the deficits identified and thereby to avoid failure.

This paper presents initial efforts with PDQ: the rationale, procedures, results, and implications for instruction.

Evidence Relating to Correlational Items

To begin with, let's clarify two very basic terms often misunderstood by those who only occasionally read statistical studies. Correlation means merely that a "co-relationship" exists; it does not imply cause-effect. For example, there is a positive correlation between the heighth of elementary pupils and reading achievement (compare first graders and sixth graders), but stretching kindergarten children will not increase their reading ability.

Secondly, statistical significance does not necessarily imply practical significance. It merely means that, given the same procedures, one is most likely to get similar results; in other words, the outcome was not a result of chance.

Unfortunately -- at least in the view of this author -- most tests used in early identification attempts only correlate with

reading success or failure; they do not have a cause-effect relationship. As a result, such tests have no diagnostic value since they present the teacher with no implications for her instructional program (other than the implied avoidance of instruction "because the child is not ready").

Many procedures, devices, and tests have been used in various attempts to predict reading success/failure. De Hirsch and Jansky (1966) investigated 37 tests in their preliminary study. While many of the tests correlated significantly with reading, again the reader is reminded of the meaning of both correlation and significance. Only two tests reached a correlation above .50, which in itself is only about 25% better than chance.

Following are some of the more commonly used criteria or tests along with comments as to their predictive and diagnostic value.

Chronological age. Jansky and de Hirsch (1972) report that chronological age does not correlate significantly with reading. Their view is supported by others, including Wolf's findings (1972) in a study of four-year-olds, where the correlation between age and success in skills was .34, i.e., about 10% better than chance.

Mental age/IQ. Typical correlations in the area of .44 (about 20% better than chance) at primary level suggest this is not an important factor in predicting reading success/failure. In fact, Durkin (1962) found no correlation between the Kuhlman-Anderson IQ and success in reading.

Even if the correlation were much better, this writer sees

the typical use of IQ or Mental Age as a fatalistic procedure, classifying the child away from intensive instruction. Actually, the lower a child's ability the more help he should get. Further than this, any diagnostic implications for reading are nonexistent.

Socio-economic status. Jansky and de Hirsch (1972) report SES does not correlate significantly with reading success/failure. While others might argue the point, this author supports their finding from a purely pragmatic view: too often low SES has been used as an "excuse" for not teaching. Besides, here again we have no diagnostic information: the teacher cannot change the child's SES.

Neurological deficits. Jansky and de Hirsch (1972) are in agreement with Bond and Tinker (1973) in stating that neurological deficits are not clearly a cause of reading failure. Like any physical deficit, this factor offers no direct implication for reading needs.

Emotional problems. This is an area which has never been resolved satisfactorily through research. In terms of reading implications, however, we know that success will not aggravate an emotional problem; failure will. Hence, the existence of an emotional problem is not an excuse for avoiding appropriate reading instruction while help is being given on the emotional problem itself.

Reading readiness tests. Of the many studies done with readiness tests, typical correlations with reading range from .40 - .60, i.e., 16% to 36% better than chance. Karlin (1957) found the forecasting efficiency of the Metropolitan Readiness

Test to be only 4% better than chance. Certainly an individual child cannot be classified on such a basis. More to the point, like the items previously discussed, readiness tests have no diagnostic value, i.e., they offer no positive implications for instruction in reading.

Teacher judgment. Kindergarten teachers usually can accurately identify the child who is going to have difficulty in reading. Often their diagnosis is that the child is "immature." This author does not question the accuracy of the prediction; on the other hand, such predictions also have no diagnostic implications for instruction; moreover, they come a year too late.

Copying forms. Jansky and de Hirsch (1972) found a correlation of .41 between the Bender-Gestalt and reading achievement, reporting this as one of the five best predictors of reading success/failure (16% better than chance!). Such a correlation leaves much room for error, especially in the case of an individual child. More important, copying forms has no diagnostic value for instruction; there is no evidence that a child must be able to reproduce forms in order to learn to read.

Visual-motor integration. This area is really not worth mentioning except for the fact that so many people seem unaware of the research relating visual-motor activities to reading. Basic studies such as those by Balow (1973), Cohen (1969), Jensen (1970), and others suggest that the Frostig materials (1964) contribute nothing to reading success. This is as far as the present writer is concerned, i.e., the fact that visual motor tests and materials have no implications for reading

instruction. However, an extensive summary of the research (Hammill, 1974) raises serious doubts as to whether visual motor integration can even be developed for its own sake.

Knowledge of letter names. Since Durrell's reports (1958), knowledge of letter names has been recognized to be equally as good a predictor of reading success as any commercial readiness test. Hillerich (1966) found a correlation of .69 between knowledge of letter names by beginning kindergarten children and their reading achievement at the end of grade one. On the other hand, this test also has no implications for instruction. A child does not need to know letter names in order to be able to read; he must have established sound associations for the letters, and this is quite different. (For a more extended discussion of evidence on this point, see Hillerich, 1966.) Hence, a test of letter names is another test which correlates with reading success/failure, but which has no diagnostic value for the teacher.

What is Necessary for Success in Reading?

The foregoing items all correlate to some extent with reading success or failure. In that sense, they "predict." However, for teachers who are more anxious to avoid failure than to predict it, we must consider what children need for success and how to diagnose for those needs.

The act of reading involves the ability to function in the language, i.e., to think in language. This means mastery of syntax and a minimal meaningful vocabulary. This in turn presumes auditory discrimination ability, i.e., ability to hear differences in sounds in words. In addition, reading deals with

printed words, so visual discrimination of letters and words is necessary.

Obviously, basic to all the foregoing are certain physical conditions. The child must have adequate vision, auditory acuity, and the general physical health to enable him to attend to learning tasks.

These prerequisites must be provided for in kindergarten for those children who lack them. Beyond this, children need instruction in additional skills basic to reading. Perhaps the best evidence to this point of instruction is the study by Dunn (1970). Using ninety randomly selected children, ages two through four, she found that time spent in instruction was the significant factor in achievement. While she also found the lowest socio-economic level gained most, IQ and age were not significant factors in achievement.

PDQ Procedures

A battery of tests was constructed, based on the needs for success in reading. The items are criterion referenced, each having its own direct implications for instruction if a child does not perform in that area. Thus, PDQ is less a screening device and more a tool for individualizing instruction in the kindergarten.

The entire battery is designed for individual administration to four and five year olds. It takes an average of fifteen minutes per child. Following is a listing and brief description of the tests included:

1. Auditory Discrimination. This author has been convinced

from years of experience that any four-year-old English-speaking child hears differences of one phoneme in a word unless he has a physical impairment. Wepman (1958) users would disagree; hence it was felt necessary to include a test of auditory discrimination ability.

The basic problem with the Wepman Auditory Discrimination Test is twofold: (a) young children don't always understand "same" and "different" in relation to a spoken word, and (b) auditory memory is a major factor being tested in the Wepman Test (Flower, 1968).

To avoid the auditory memory problems of the Wepman, this author constructed an auditory discrimination test of thirty-three picture pairs, administered by saying: "I'll name two pictures and then ask you to point to one of them. You point to the one I tell you. Ready? (Point) Shoe, (Point) Sue. Point to shoe."

2. Listening comprehension. Here the child was read a story of one paragraph and asked to tell what the story was about. He was checked on six "memories" and a sequence of three major events.

3. Vocabulary. A total of thirty-eight pictures were presented for the child to name. These included six to seven items in each category: domestic animals, clothes, tools, foods, vehicles, and wild animals.

4. Ability to categorize. Using the vocabulary items after each category was completed, the child was asked, "How are all of these pictures alike?"

5. Relationship words. Using manipulative materials, children were asked to demonstrate understanding of thirteen relationship words such as little, in, front, and so on.

6. Picture sequence. Children were asked to arrange three pictures to tell a story ("Which comes first?").

7. Oral language development. Using the sequenced pictures, children were asked to tell the story. Their stories were taped, transcribed and analyzed for length of T-unit. (Hunt, 1965).

8. Following oral directions. Children were given one-, two-, and three-step oral directions.

9. Using oral context. Seven items ranged in difficulty from general context to the more specific: "Daddy wrote a letter with his new ___."

Visual discrimination was not tested separately because children were using this ability in many test items. Admittedly, many of these children would not distinguish b and d -- or possibly even m and n -- on a pencil-and-paper test. This, however, is a matter of attending to details which may or may not be significant to the child -- details which must be specifically taught.

On the other hand, visual acuity (at near-point) and auditory acuity (bell tone) were both tested early in the kindergarten year. These tests resulted in the referral of several children.

Preliminary Results of PDQ

Summer meetings with the superintendent and kindergarten teachers in District 105 (La Grange, Illinois) led to the initiation of PDQ in September, 1974. La Grange, a western suburb of Chicago, is essentially a blue-collar community.

In September, 1974, kindergarten children (N=153) were tested by their teachers and this author. These PDQ children will be

compared to controls for reading achievement in May, 1975. Meanwhile, results of PDQ testing were available in September and led to changes in the kindergarten program.

The La Grange kindergarten program was already up-to-date, including the teaching of pre-reading and, in some cases, reading skills. Nevertheless, kindergarten teachers found some children much more proficient in their development than expected. These children were ready to go much farther.

On the other hand, the PDQ tests identified other children for whom instruction had to begin at a much more basic level than expected. These children did not have basic language skills heretofore assumed for all.

While averages mean little when one is individualizing, they were computed for statistical purposes. The reader may be interested in some findings listed in Table 1.

Table 1. Results of PDQ Testing, September, 1974
(N = 153)

Activity	Average Score	Possible Score
Auditory Discrimination	32.0	33.0
Listening Comprehension	4.2	6.0
Vocabulary	32.9	38.0
Categorizing	3.6	6.0
Relationship Words	11.8	13.0
Picture Sequence	35%	100%
Oral Language Development	5.9 words/ T-unit	---
Following Oral Directions	11.0	12.0
Using Oral Context	6.5	7.0

As shown in Table 1, few children had difficulty in Following Oral Directions, Using Oral Context, or Auditory Discrimination. Regarding the latter, testing evidence also discounts the relationship between immature speech and auditory discrimination: children who called ring "wing" still distinguished between ring and wing. The speech "problem" of such children is expressive, not receptive.

Oral Language Development was at least typical for this age, as compared to results reported by Templin (1957), O'Donnell (1967), and Loban (1963).

Many children needed work in Listening Comprehension and most needed to develop understanding of Categorizing. This latter finding was not surprising, but was seen by this author as an important understanding often neglected in early teaching.

Implications for Instruction

From each of the test titles, most kindergarten teachers see immediate implications for instructing the child who shows a weakness in that area. Following are a few examples of the kinds of kindergarten activities appropriate for children who need additional work in a given area:

1. Auditory Discrimination

   Experience with oral language -- listen and discuss

   Nursery rhymes

   Miscall pictures: "Is this a call?" (for ball)

   Funny questions: "Do you eat jello or yellow?"
   "Do you sleep in a red or a bed?"

   Make sound pages or have treasure hunts

   Going to Boston: (e.g., Jane will take only /jacks, jumpers, jelly, etc./)

2. Listening Comprehension

Read to the child and discuss for fun: "Would you have . . .?"
"Why do you think . . .?"

Nonsense to correct: "Do chairs eat?" "Do dogs fly?"

Use taped stories; have child draw his interpretation and tell about it.

/Note: Use parent volunteers to read to children; also use older children./

3. Vocabulary

Experiences with common objects and pictures of them.

Name an object in view, e.g., ball. Have one child use it in a sentence ("That is a ball."). The next child adds a describing word ("That is a blue ball."). The next child adds another (". . . big blue ball.").

"War" -- Make a deck of picture cards for common items. Two children play. Put the deck face down and players alternate in turning up a card. If player names the picture, he gets it; if not, his opponent gets it.

4. Categorizing

Show three or four pictures and ask children which does not belong. (e.g., pig, cow, sweater, dog) Discuss why!

Sort pictures into piles that are "alike." Discuss how they are alike.

Take a group of about six objects in the room and classify them in various ways -- size, color, shape, texture, use, etc. (e.g., sweater, scarf, cube, pencil, soft sponge, mitten. Classify and re-classify by hard/soft, color, wear/don't wear, big/little.)

Three paper plates and pictures of food -- sort by three meals. Re-sort by other categories (hard/soft, color, etc.)

Materials: blocks of various sizes/colors; bottle caps, buttons, pictures from home

AAAS Science Kit

Have children bring three or four pictures that are alike in some way. Have the group decide how they are alike.

5. Relationship Words

Direction-type activities; games; fingerplays; "Simon Says."

Movement exploration: Use a large box -- children "get in," "go around," "get behind," etc.

Later, have the child verbalize -- "I'm in the . . ." "I'm under the . . ." etc.

6. Picture Sequence

Field trip and discuss -- What did we do first? etc.

Read a story/nursery rhyme and discuss -- what happened first, etc.

Short picture books can be cut up, the story told, and the pictures arranged in sequence.

SeeQuees (Limit to 4-6 pieces)

Sequential Picture Cards (Developmental Learning Materials)

7. Oral Language Development

Use a variety of experiences to get child into a TALK situation

Field trip; even a walk for a specific purpose, e.g, sounds, colors, shapes, living things, etc.

"Feelie Box" -- child feels and describes covered object; others must guess what is being described

Sharing Time (Show and Tell): work toward small groups simultaneously sharing, so more can talk

Group singing

Impromptu puppet plays

Story Without Pictures (Western Publishing Co.)

Peabody Language Kit (American Guidance Service)

Tape recorder for child to talk into

Photographs taken of kids; let them tell about the photos

Sounds and Patterns, Preschool-Grade 1 (Holt); Story Starters (Ginn); Benefic Press photos; Getting a Head Start (Houghton).

/Again, use parent volunteers or children who can read/

8. Following Oral Directions

Games with 2 and 3 step directions

"Simon Says"

Set up "Grocery Store" -- have child get . . .

Simple art project -- give directions visually and orally at first; later give orally only

9. Using Oral Context

Give a sentence with a word missing; let children make up additional practice sentences.

Read a story and let children supply a word you leave out now and then.

Getting Ready to Read (Houghton Mifflin)

In Summary

This has been a report of the rationale and results of using a battery of language-related tests for diagnostic purposes. Subjects were pre-kindergarten children.

The effectiveness of PDQ in terms of future reading success will not be known for another year. Meanwhile, the diagnostic procedure has had an impact on kindergarten instruction. It has led to greater individualization for all children, as teachers follow the PDQ screening with the instruction implied by the tests.

Among the important side-effects of the first year's efforts was the pleasurable introduction to school of the kindergarten children. Testing pleasurable? Yes, they played "games" on a one-to-one basis with their teacher, and they were all "successful." Secondly, parents appreciated the school's efforts to further individualize the kindergarten program.

The author certainly does not hold the specific tests sacred or infallible. On the other hand, he is firmly bound to the direction: let's stop assigning children to failure; let's provide instruction at their level of development.

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